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09/818,605	03/28/2001	Daisuke Kotake	2355.12119	1877

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EXAMINER

EDWARDS, PATRICK L

ART UNIT	PAPER NUMBER
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2621

DATE MAILED: 02/12/2004

7

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/818,605

Applicant(s)

KOTAKE ET AL.

Examiner

Patrick L Edwards

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 5.6.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

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DETAILED ACTION

Claim Rejections - 35 USC § 112

1(a). The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1(b). Claims 5 and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With regard to claim 5, which is representative of claim 16, the metes and bounds of the phrase “distance obtained by position data” are not clear. It appears as if this term may lack antecedent basis.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-7, 10, 12-18, 21, 23 and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Laumeyer et al. (USPN 6,266,442 B1).

With regard to claim 1, which is representative of claim 12, Laumeyer discloses holding means for holding plural pieces of frame data (col. 12 lines 61-62) obtained from image data input at a plurality of positions (col. 10 lines 40-59). The “image list” database disclosed in Laumeyer is analogous to the holding means recited in the claim.

Laumeyer further discloses means for extracting, from the frame data held by the holding means, the frame data determined to have been captured at substantially a same position (Figure 4). The bitmap sign regions correlated to classified triangulated location disclosed in Laumeyer are analogous to frame data captured at substantially a same position as recited in the claim. The saving of bitmapped sign regions and the subsequent pair matching algorithm as disclosed in Laumeyer qualify as the extraction step recited in the claim.

Laumeyer further discloses a means for deleting frame data overlapping another piece of extracted frame data (Figure 4). Removing matched pairs from the search space as disclosed in Laumeyer is analogous to deleting overlapping frame data as recited in the claim.

Laumeyer further discloses means for storing, after associating with a position on the map, remaining frame data after the deletion process (Figure 4). The "sign list" storage spot disclosed in Laumeyer is analogous to the storing means recited in the claim in that the matching images are stored in the sign list storage spot after they are deleted from the holding means (Figure 4 and col 13 lines 54-60).

With regard to claim 23, a computer-executable program comprising code which causes the computer to execute the steps of a method is essential if the image processing method disclosed in Laumeyer is to function. Therefore, a computer-executable program is inherent in the teachings of Laumeyer.

With regard to claim 24, a storage medium that stores a computer-executable program which causes the computer to execute the steps of a method is essential if the image processing method disclosed in Laumeyer is to function. Therefore, a storage medium is inherent in the teachings of Laumeyer.

With regard to claim 2, which is representative of claim 13, Laumeyer discloses that the frame data stored in the holding means (image list database) is associated with position data indicating a position at which each piece of frame data is captured (col. 5 lines 45-54). Laumeyer further discloses

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that the extraction means extracts frame data matching in position data (the "image list" box of Figure 4). The frame data in Laumeyer are extracted according to their triangulated location. Please note that the triangulated location is determined based on the position at which each piece of frame data is captured (col. 5 lines 45-54) and consequently qualifies as the position data recited in the claim.

With regard to claim 3, which is representative of claim 14, Laumeyer further discloses that position data is obtained based on GPS (col. 5 lines 45-54).

With regard to claim 4, which is representative of claim 15, Laumeyer further discloses that image data is captured with a plurality of moving capture devices for capturing different directions (Figures 3A and 3B). The capture devices 10,20,30,40 move with the vehicle and capture different directions. Laumeyer further discloses that position data is obtained from a distance meter for measuring a moving distance of a moving object which moves with said plurality of capture devices (col. 5 lines 45-54). The inertial navigation system INS disclosed in Laumeyer is a distance meter which measures a moving distance of a moving object.

With regard to claim 5, which is representative of claim 16, Laumeyer discloses a setting means for setting sampling intervals of frame data (col. 5 lines 32-33). Laumeyer discloses a camera with a frame rate. Inherent in any camera with a given frame rate is a setting means for setting the frame rate. For any given frame rate (set by a setting means), the sampling interval (distance between captured frames) will vary proportionally with the driving speed. For example, the sampling interval of a capture device with a given frame rate will increase with increased driving speed and decrease with decreased driving speed. As a result, we can conclude that Laumeyer inherently teaches a setting means for setting the sampling interval. Laumeyer further discloses an extraction means which extracts two images (frame data) which have a corresponding location (col. 18 lines 25-29 and Figure 4). Since these locations are equivalent, it follows that the position data distance is shorter than the sampling interval distance.

With regard to claim 6, which is representative of claim 17, Laumeyer discloses associating pieces of frame data with speed data obtained at capture (col. 5 lines 47-49). Laumeyer discloses using an inertial navigation system (INS), which is a system which uses speed data to judge location coordinates. Consequently, Laumeyer discloses associating pieces of frame data with speed data obtained at capture. Laumeyer further discloses a means for using speed data in order to extract a group of frame data that indicates a stop of movement (col. 5 lines 47-49). Laumeyer discloses using an INS in order to associate each captured image frame with the location at which it was captured. An INS uses the vehicle's speed to determine a location. It follows that the location data produced by the INS will remain the same if and only if a stop of movement has occurred. Since Laumeyer also discloses extracting frame data based on the correlation of the locations of images (plural images with the same position data are extracted), it follows that Laumeyer teaches using speed in order to extract a group of frame data that indicates a stop of movement.

With regard to claim 7, which is representative of claim 18, Laumeyer discloses a determination means for comparing two pieces of frame data and determining whether or not the two pieces of frame data have been captured at the same position (Figure 4). Figure 4 shows correlating frame data based on location. Correlating frame data based on location as disclosed in Laumeyer qualifies as determining whether or not two pieces of frame data have been captured at the same position as recited in the claim. Laumeyer further discloses extracting the frame data that the determination means determines has been captured at the same position (Figure 4).

With regard to claim 10, which is representative of claim 21, Laumeyer discloses that image data is captured while a plurality of capture devices are moving when capturing images in different directions (Figure 3B). Figure 3b shows cameras which capture images in different directions while moving as the vehicle is moving. Laumeyer further discloses that the frame data adopted by said determination means is obtained by a capture device facing in a direction vertical to a moving direction (Figures 3A and 4).

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Figure 3A shows cameras 10 which face in a direction vertical to the moving direction. Figure 4 shows that the frame data captured in this front facing direction is used by the determination means.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 8, 9, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laumeyer as applied to claims 1, 7, 12 and 18 above, and further in view of Hsu (USPN 6,587,601 B1). The arguments as to the relevance of Laumeyer as applied in paragraph 2 above are incorporated herein.

With regard to claim 8, which is representative of claim 19, Laumeyer discloses determining whether or not two pieces of frame data were captured at the same position. Laumeyer discloses that the two pieces of frame data match when they correspond to the same location. It follows that the relative distance between the pieces of frame data must be equal to or smaller than a predetermined value of 0. Laumeyer fails to expressly disclose making that determination by computing a least squares error between two pieces of frame data.

Hsu, however, discloses computing the least squares error between two pieces of frame data (Hsu column 10 lines 12-57). The video frame image and reference frame image disclosed in Hsu are analogous to the two pieces of frame data as recited in the claim. It would have been obvious to one reasonably skilled in the art at the time of the invention to modify Laumeyer's image capture location matching system to include that a relative distance between two image frames is computed using a least squares error method as taught by Hsu. Such a modification would have allowed for a system that could

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match image capture locations that were very similar but not exactly the same. This would have made for a more flexible and robust system.

With regard to claim 9, which is representative of claim 20, Hsu further discloses that the determination of the least squares error, which computes a relative distance between two pieces of frame data, is based on corresponding points of the two pieces of frame data (Hsu col. 10 line 30 equation 3).

5. Claims 11 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laumeyer as applied to claims 1 and 12 above, and further in view of Miwa et al. (EP 977 014 A2). The arguments as to the relevance of Laumeyer as applied in paragraph 2 above are incorporated herein.

With regard to claim 11, which is representative of claim 22, The claim recites a means for setting the sampling interval of frame data, a means for obtaining a plurality of pieces of frame data over a distance corresponding to two points on a map, a means for using the sampling interval and the distance between the points to determine the number of frames that should be taken between the two points, and a means for thinning out the captured number of frames. Laumeyer discloses a camera with a frame rate (Laumeyer col. 5 lines 32-33). The camera inherently comprises a means for setting this frame rate. For a given frame rate, the sampling interval (distance between captured frames) will vary based on the driving speed. The sampling interval of a capture device with a given frame rate will increase with increased driving speed and decrease with decreased driving speed. As a result, we can conclude that Laumeyer inherently teaches a setting means for setting the sampling interval.

Laumeyer further discloses a means for obtaining a plurality of pieces of frame data over a distance corresponding to two points on a map (Laumeyer Figure 3b). Figure 3b shows a traveling vehicle with side facing cameras 20 and 30 that obtain plural pieces of frame data as the vehicle moves in the forward direction. As the vehicle moves in a forward direction, the side facing cameras capture frame data along a line between two points on a map. This is inherent in the teachings of Laumeyer because the

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side facing cameras will always capture a frame data group corresponding to a line between any two points on a map that the vehicle passes by.

Laumeyer fails to expressly disclose a means for using the sampling interval and the distance between two points on a map to determine the number of frames between the two points, or a means for thinning out the captured number of frames. Miwa, however, discloses a means for determining the number of frames between two points by using the sampling interval and the distance between two points (Miwa col. 1 lines 14-21). Miwa discloses storing plural frame data (series shots) along a road in a storing portion and having the position data of each of the frames stored along with the frame. As a result, the number of image frames between two given points can be computed based on the distance between those two points and the sampling interval (or distance between individual image frames). Miwa further discloses performing a thinning operation on the captured number of frames (Miwa col. 2 lines 42-45). It would have been obvious to one reasonably skilled in the art at the time of the invention to modify Laumeyer's image processing apparatus by determining the number of frames to be captured over a given area and then performing a thinning operation on those frames as taught by Miwa. Such a modification would have allowed for a system of capturing images that allowed the frame data to be thinned such that all the captured frames could be obtained and none of the frames would have to be discarded.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Lanckton et al. (USPN 5,517,419)

Harada (USPN 6,075,559)

Oishi et al. (USPN 6,282,245)

Yeo et al. (US PGPUB 2002/0070958)

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Okada (USPN 6,268,825)

Endo et al. (USPN 6,335,754)

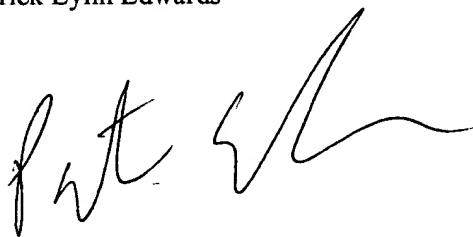
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick L Edwards whose telephone number is (703) 305-6301. The examiner can normally be reached on 8:30am - 5:00pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Boudreau can be reached on (703) 305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

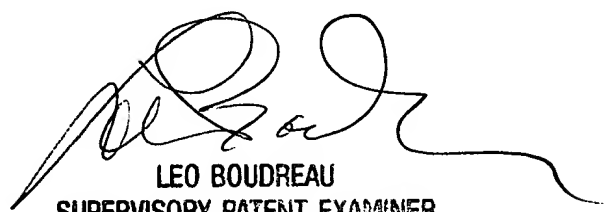
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Patrick Lynn Edwards

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